NSDD
NUCLEAR SMUGGLING DETECTION AND DETERRENCE

Sustainability Program Description

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Global Material Security

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Revision History

This document will be reviewed/updated annually

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Initial Release	-	March 2021	Baselined by the Configuration Control Board

Acronyms

BMWG	Border Management Working Group
CM	Country Manager
CNS	counter nuclear smuggling
CNSA	Counter Nuclear Smuggling Assessment
CONOPS	concept of operations
COR	Contracting Officer Representative
DOE	U.S. Department of Energy
DNN	Defense Nuclear Nonproliferation
DPD	Deputy Program Director
DRD	design requirements document
EC	Event Coordinator
EC-JRC	European Commission Joint Research Center
FY	fiscal year
GICNT	Global Initiative to Combat Nuclear Terrorism
IAEA	International Atomic Energy Agency
ILEA	International Law Enforcement Academy
INTERPOL	International Criminal Police Organization
KMW	Knowledge Management Website
LMP	local maintenance provider
M&O	management & operating
MOU	memorandum of understanding
NSDA	nuclear security detection architecture
NSDD	Nuclear Smuggling Detection and Deterrence
NNSA	National Nuclear Security Administration

PD	Program Director
PNNL	Pacific Northwest National Laboratory
R/N	radiological and nuclear
RD&P	Regulatory Documents & Procedures
RDS	radiation detection system
RPM	radiation portal monitor
SM	Sustainability Manager
SME	subject matter expert
VPN	virtual private network
W/E	Workshops and Exercises
WCO	World Customs Organization

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1. Introduction

The U.S. Department of Energy/National Nuclear Security Administration's (DOE/NNSA) Office of Nuclear Smuggling Detection and Deterrence (NSDD) plays a critical role in U.S. Government efforts to prevent nuclear and radiological terrorism. NSDD enhances U.S. national security by implementing and sustaining partner countries' capabilities to detect, disrupt, and investigate the smuggling of nuclear and radiological (R/N) material before this material can be used against the United States or its interests. The goal of the NSDD Sustainability Program is to build partner capacity to indigenously sustain and continuously improve the people, processes, and equipment associated with their counter nuclear smuggling (CNS) programs.

1.1. Sustainability Program History

In 2009, given the rapidly growing number of installed NSDD sites, the Sustainability Program was formally established to ensure appropriate emphasis was given to strengthening the capability of partner countries to operate, maintain, and manage NSDD-deployed radiation detection systems (RDS) over the long term.

In fiscal year (FY) 2017, the Sustainability Program conducted a strategic evaluation to assess the efficacy of its approach to capacity building. That evaluation, coupled with the Nuclear Security Detection Architecture (NSDA) model being promoted through International Atomic Energy Agency (IAEA)-published Nuclear Security Series documents, led the Sustainability Program to develop five-performance categories documented in this *Sustainability Program Description*: (1) Policies and Procedures; (2) NSDA Operations; (3) Training; (4) Maintenance; and (5) Assessment. This model is comprehensive, applying to all three of NSDD's deployment approaches: point of entry, frontier area, and internal security and law enforcement. Additional information on NSDD's Implementation Program and strategy is available in the *Implementation Program Description*.

2. Organizational Structure

The NSDD Sustainability Program (hereafter Sustainability) is led by a Program Director (PD) and Deputy Program Director (DPD). They are supported by a Federal team that oversees the NSDD Sustainability activities executed by National Laboratory and contractor country project teams. In addition, overarching Sustainability Functional Teams provide strategic direction and expertise to country teams in distinct, cross-cutting subject areas.

2.1. Sustainability Program Director/Deputy

The Sustainability PD and DPD provide leadership, program management, and financial oversight for all sustainability projects and ensure that these projects are executed in accordance with NSDD, Office of Defense Nuclear Nonproliferation (DNN), and NNSA guidelines. They provide strategic direction for Sustainability activities and direct/mentor Federal and contractor staff. The PD and DPD are also responsible for coordinating activities with Implementation Program leadership and reporting to the NSDD Office Director and Deputy Director.

2.2. Country Teams

NSDD country teams are responsible for all aspects of engagement with a partner country. Most capacity-building activity is conducted directly with partner agencies. The country team may engage with one or more partner agencies within each partner country. Although the makeup and structure of country teams can vary, to include multidisciplinary team members from the U.S. National Laboratories and contractors, all country teams are led by a Country Manager (CM) and Sustainability Manager (SM).

2.2.1. Country Manager

NSDD work is implemented through bi-lateral and multi-lateral engagements with foreign countries and international organizations, and each engagement is assigned a CM to develop and manage relationships and oversee NSDD's activities during the life of the project. CMs serve as project managers and are responsible for monitoring their project's costs, schedule, and resources, as well as ensuring assigned projects meet all program and contractual requirements. CMs integrate and lead country teams and are responsible for coordination of partner agency engagements with colleagues from within the Office of Global Material Security, DNN, NNSA, and other interagency offices. CMs may also be assigned to lead or support internal NSDD projects (e.g., a maintenance task force or new vector project plan development).

2.2.2. Sustainability Manager

SMs are National Laboratory or contract personnel that work with CMs to coordinate the execution of projects with partner countries. SMs coordinate sustainability visits and subsequent reporting, identify training needs, evaluate capabilities, manage maintenance contracts, and provide other support to CMs as needed. SMs are also responsible for cultivating reliable points of contact and effective working relationships with in-country resources. The CM remains responsible for budget and project planning, as well as oversight of SM performance.

2.3. Sustainability Functional Teams

Sustainability uses functional teams to support country teams. These functional teams include: (1) Regulatory Documents & Procedures (RD&P), (2) Training, (3) Maintenance, (4) Workshops & Exercises (W/E), (5) Investigation Support, (6) Peer-to-Peer, (7) Data Analyses, and (8) Performance Evaluation. Overviews of each functional team are provided in Section 5 of this document.

2.3.1. Functional Team Leads

Each functional team has a Federal lead who is responsible for coordinating activities by subject matter experts (SME) in developing program resources and guidelines associated with each team, as approved by the Sustainability PD and DPD. Functional team leads are also responsible for coordinating with country teams as functional team activities are developed and executed.

2.3.2. Subject Matter Experts

NSDD employs SMEs to support each functional team and typically consist of National Laboratory employees, contractors, or representatives from other U.S. Government agencies and international organizations.

2.4. International Resources

NSDD leverages multiple in-country and international resources, including contracting with logistics, transportation, and language support providers. NSDD also partners with several international organizations to provide sustainability capability building to countries across all functional areas.

2.4.1. Forward Deployed Personnel

NSDD has forward-deployed resources in multiple regions that represent NSDD and assist country teams with partner country stakeholder communications and other activities. CMs and country teams are responsible for coordinating with forward-deployed resources to assist those teams in completing approved scope. Forward-deployed personnel provide information and advice to CMs and NSDD leadership and receive direction (through their Laboratory Task Order Requestor) from CMs and NSDD leadership on their activities and engagement with partner country officials.

2.4.2. Local Maintenance Providers

NSDD typically contracts with a local maintenance provider (LMP) to ensure routine preventive and corrective maintenance is performed on NSDD-deployed systems. LMPs may be a competent authority identified within the partner country government or an external local company. NSDD has developed a statement of work template that illustrates expected work scope. LMP contract management support is provided by Pacific Northwest National Laboratory (PNNL). Once a contract is in place, NSDD receives information from LMPs regarding the routine and corrective maintenance of deployed RDS. These reports describe any performance issues with the RDS, components replaced, and how the issues were addressed. It is important to note that NSDD's goal is for the partner agency to assume full maintenance responsibility without a NSDD-supported LMP.

2.4.3. Regional Assets

NSDD works to promote capabilities at a regional level (in addition to those created at the site or country level) that improve NSDD's ability to accomplish its mission. Working under a laboratory managed subcontract, regional assets can support sustainability efforts in multiple countries, to include training, maintenance, equipment procurements, and logistics support. This reduces cost to NSDD and improves proficiencies in the services and expertise afforded partner countries. These same regional assets are available to partner countries directly as they assume fully the operations, maintenance, and management of their detection systems.

2.4.4. International Organizations

NSDD collaborates with international organizations and other donor countries to assist partner countries with sustaining their radiation detection operability. One coordinating mechanism is the Border Monitoring Working Group (BMWG), which convenes with participants from the European Commission Joint Research Centre (EC-JRC) and the IAEA, among others. In keeping with NSDD attention to regional strategies, Sustainability also conducts targeted partner agency work through the regional Science Centers, the Science and Technology Center of Ukraine (STCU) and the International Science and Technology Center (ISTC). Other organizations that contribute to Sustainability efforts include, but are not limited to, the Global Initiative to Combat Nuclear

Terrorism (GICNT), International Criminal Police Organization (INTERPOL), Nuclear Forensics International Technical Working Group (ITWG), International Law Enforcement Academy (ILEA), and the World Customs Organization (WCO).

3. Sustainability Framework and Objectives

Sustainability capacity building activities span the full range of people, process, and equipment fundamental to a partner agency's CNS program. Country teams are responsible for implementing solutions to establish or enhance a partner's CNS program and to plan for the long-term support and operability of these solutions. Sustainability support is applied in a manner that is coherent at the national level and may involve more than one partner agency in a country. This support is extended to both radiation detection and mission-enabling (non-detection) tasks.

3.1. Performance Categories

Sustainability support is designed as a process of continuous improvement. A partner's progress in developing and maintaining operational capability of CNS programs is tracked in five performance categories: (1) Policies and Procedures, (2) NSDA Operations, (3) Training, (4) Maintenance, and (5) Assessment. Each of the eight functional areas offers capacity-building tools that can be mapped to one of the five performance categories.

3.2. NSDD Partner Performance Evaluations

NSDD measures and observes partner agency operations to identify any deficiencies and associated corrective actions that can be addressed in both mid-year and out-year budget planning. These measurements and observations serve to inform Congressional metric reporting as captured in the Counter Nuclear Smuggling Assessment (CNSA). The CNSA is a transparent, semi-quantitative measure of partner agency progress in achieving and maintaining baseline counter nuclear smuggling operability. The CNSA is performed quarterly by NSDD and reported annually to Congress. Measurements and observations used in the CNSA are also used to identify any specific partner agency deficiencies and associated corrective actions that can be addressed in out-year budget planning through the NSDD Commitment Assessment.

3.2.1. Counter Nuclear Smuggling Assessment

NSDD is responsible for annually reporting to Congress the results of the "*Counter Nuclear Smuggling Assessment*", which is defined as the "*Percentage of NSDD partner agencies demonstrating operational capability of counter nuclear smuggling systems*". The FY2021, year-one target is 75% of partner agencies. The target increases annually from FY2021 to FY2025, with the FY2025 target reaching 80% of partner agencies.

This CNSA is measured across each of the five performance categories on a quarterly basis. Its scope is strictly limited to radiation detection capabilities. It does not distinguish whether the operability is achieved through NSDD or partner agency resources. For example, the maintenance assessment determines if maintenance of the

RDS is being performed appropriately regardless of whether that maintenance is provided by the operating agency or some other source, such as NSDD, IAEA, or another entity.

The CNSA is a practical, holistic measure of baseline radiation detection operability that focuses on the outcomes of capacity building.

3.2.2. Commitment Assessment

Measurements and observations of partner agency operations also contribute to the annual NSDD Commitment Assessment. This process is used by NSDD country teams and management to plan activities and budget for capacity building support that will have the greatest impact on the sustainability and effectiveness of each partner agency's radiation detection mission. The Commitment Assessment is made across the five performance categories. The results are used to identify the partner agency's deficiencies and determine corrective actions, by mapping to specific, appropriate capacity building tools from one or more of the eight functional areas.

3.2.3. Observations and Measurements

To be clear, the partner agency Commitment Assessment and the CNS Assessment are related. They are both derived from the identical set of measurements and observations across the five performance categories. The CNSA is designed to evaluate NSDD performance in establishing the elements of a sustainable baseline counter nuclear smuggling operability with partner agencies, within the scope of the program and its strategic direction. The Commitment Assessment is designed to identify and remediate partner agency deficiencies in operating, maintaining, and managing the granular elements of long term, successful operation of the RDS.

While there is a common set of measurements and observations used in the CNSA and Commitment Assessment, the data does not necessarily provide direct, single-factor evidentiary support. For the CNSA, the data is interpreted using a rubric that is binary, requiring Yes-No answers to simple narrative questions that highlight the essence of baseline operability in each performance category, in the context of NSDD scope and strategy. The Commitment Assessment is designed to identify partner agency progress by highlighting areas for improvement, requiring substantive questions that are answered with a graduated rubric to aid in interpreting the data. As noted above, NSDD's thorough assessment process aims to ensure the accuracy and reproducibility of these measurements and observations across partner agencies and over time.

3.2.3.1. Sustainability Visits and Technical Data Sharing

Sustainability visits and data sharing are important methods for collecting observations and acquiring data relevant to operability. Sustainability visits are on-site activities conducted by NSDD representatives or partner country stakeholders with the objective of acquiring observations and data relating to the proficiency of the radiation detection operations. These are announced events that are done in collaboration with local operators. The sustainability visit outcomes include evaluation of equipment performance, identification of gaps in standard operating procedures, assessment of spare parts inventory, and analysis of faults in radiation portal monitors (RPM) when conducted at points of entry.

With partner agency concurrence, relevant equipment performance data is shared with NSDD. This data can be transmitted on a scheduled basis from the operating site to subject matter experts in the partner country or at U.S. National Laboratories. Trend analysis of RPM daily files can be used to identify RPM faults and diminished detection performance.

3.2.3.2. Confidence in Observations and Measurements

3.3. NSDD has identified specific observations and measurements relevant to nuclear detection operability. These observations and measurements are useful only if they accurately indicate the state of operability and are reproducible. Confidence in the final metric and commitment scores depends on rubrics that account for these considerations. The Metric Determination Guide and Commitment Determination Guide also provide support to country teams in conducting accurate and repeatable assessments.

Sustainability Annual Budget Planning and Mid-Year Adjustments

The budget process for Sustainability activities accounts for NSDD mission priorities and the evolving needs of partner agencies. Annual budget planning is an opportunity for country teams to address partner agency deficiencies in specific performance categories. Budget decisions are directly tied to the partner agencies' detection operability, as evaluated within the NSDD Commitment Assessment process. Country teams also have opportunities to adjust planning during the year in response to evolving partner needs; these needs may be reflected during the quarterly CNSA. Again, the singular goal in annual and mid-year Sustainability planning is the promotion of partner agency detection operability.

3.3.1. Determination of Target Budget Levels

NSDD management determines the overall Sustainability target budget level. Based on this direction, the Sustainability PD and DPD recommend budget allocations across both partner countries and functional areas. Partner country budget levels are determined by the prospective smuggling risk reduction, partner agency commitment to enhancement efforts, deficiencies in operability, and historic (past) budgets. Functional area budget allocations are determined by the demand of support from country teams and Sustainability development needs. The recommendations are subject to NSDD management review and approval.

3.3.2. Selection and Prioritization of Activities

The complete set of Sustainability capacity building activities ranges across eight functional areas: Regulatory Documents & Procedures, Training, Maintenance, Workshops and Exercises, Investigation Support, Peer-to-Peer, Data Analyses, and Performance Evaluation. Integral to their annual planning, country teams select specific activities from these functional areas based on their partner agency needs and budget target levels. Country team activity selections are submitted to the Sustainability PD and DPD for review and prioritization (i.e., approved, pending, below the line) based on reconciliation of all country teams' requests and available (projected) resources (budget, personnel, etc.). Country Managers meet with NSDD management to discuss and finalize Sustainability activity planning for their full portfolio of countries.

3.3.3. Activities Tracking and Adjustments

While most Sustainability activities identified during the annual budget process are implemented as planned, there are cases where mid-year adjustments are required due to scheduling conflicts and evolving partner agency needs. Accordingly, NSDD Sustainability maintains a process to track and adjust activities on a continuous basis. This mid-year agility is particularly important in responding to operability deficiencies discovered in the quarterly CNS Assessment process.

4. Service Life Considerations

As with any electronics system, the RDS is subject to service life considerations. System components have a finite operating time after which performance reliability diminishes drastically, regardless of any routine maintenance that is performed. Ideally, system operators account for the end of service life in their long-term budget planning. NSDD finds that many partner agencies are committed to staffing detection operations and performing routine maintenance and repair, but they are unable to secure the funding necessary for capital equipment upgrade investments. NSDD recognizes that it is prudent to assume for select countries the modest costs of remediation, upgrades, and replacements when considering the initial deployment costs and threat reduction benefits to the United States.

4.1. Site Remediation and Upgrades

The site-specific RDS configuration is determined as part of the implementation planning process. Many configurations use computers and networking components that can exhibit end of service life concerns after five to seven years. Associated software and auxiliary equipment, such as cameras, can become obsolete and require upgrades or replacement. Finally, while the RPM service life can be on the order of fifteen years, internal components can fail or become obsolete.

NSDD monitors the entire deployed fleet of RDS for such service life issues and manages annual site remediation and upgrade campaigns that address the sites with the greatest needs. These campaigns are highly proficient as they do not typically entail infrastructure changes (e.g., no trenching for cabling), employ local or regional maintenance providers for the work, and deploy the simplest communications system commensurate with site operations.

NSDD will usually perform these service life extensions in three to five partner countries every year.

4.2. Replacement of Handheld Radiation Detectors

Based on the same concerns and benefits as with the RDS, NSDD enhances partner country detection operability by replacing failed and obsolete handheld radiation detectors with new units for comparable applications. The added benefit with new handheld radiation detectors is that the detection sensitivity and isotope identification performance can be markedly improved, when compared to the originally deployed equipment.

NSDD monitors the entire deployed fleet of handheld radiation detectors and, with NSDD country team support, prioritizes the distribution of replacement units to partner countries. The choice of manufacturer and model depends on the application and is selected by country teams from a list of approved detectors exhibiting a baseline detection and/or identification performance, as well as acceptable sustainability characteristics as determined by laboratory testing (conducted by the NSDD Science and Engineering Team) and an analysis of alternatives. Country teams make their requests for handheld detectors in March during the budget build process. Based on those requests, Sustainability budgets for an annual distribution of replacement handheld detectors.

4.3. Management of Non-Radiation Detection, Mission-Enabling Items

NSDD incorporates a nationally coordinated, layered defense approach to CNS by working with partner agencies at points of entry, frontier areas, and interior locations to increase the probability of encounter with smugglers. This layered defense approach includes providing support beyond radiation detection to include mission-enabling equipment that is broadly useful for counter smuggling efforts. These non-radiation detection, mission-enabling items are afforded the same sustainability considerations as the NSDD-deployed radiation detection measures. Country teams are responsible for forming a practical, coherent sustainability plan for the entire partner country that accounts for all capabilities (radiation and non-radiation) at all locations of operation (points of entry, frontier areas, and interior locations).

Any mention of equipment within the CNS Assessment and partner agency Commitment Assessment processes refers specifically to radiation detection equipment; mission enabling equipment is not considered in these assessments.

4.4. Cyber Risks Considerations

NSDD operates with an awareness that cyber risks are ubiquitous. A principal concern is the risk of unmanaged and unauthorized access to operational RDS. In the past, NSDD had seen benefits to remote access to RDS, to collect daily files and system logs, conduct preventive and corrective system administration, install system patches and anti-virus definition files, conduct diagnostics, and do troubleshooting. The benefits from remote access are outweighed however by the accompanying cyber risks, which include operational, and reputational risks to partners and NSDD. Furthermore, remote access by NSDD data analysts and maintenance providers is not required for meeting sustainability objectives and needs for support of deployed RDS. Per NSDD direction, virtual private network (VPN) usage is not permitted without explicit approval by the partner agency and NSDD management.

A separate set of considerations is the inclusion of cyber principles in NSDD training and other capacity building support provided to partner countries. These tools are being developed in accordance with partner needs relating to radiation detection operability.

5. Sustainability Functional Areas

NSDD support to partners is responsive to their specific needs, commensurate with their technical and fiscal infrastructure, and integrated with the detection implementation project life cycle. The associated Sustainability support activities range across eight functional areas: RD&P, training, maintenance, workshops and exercises, investigation support, peer-to-peer, data analyses, and performance evaluation. These activities in turn map to one of the five performance categories.

Each of the eight functional areas is managed by a Federal staff member according to the approved budget and scope, and with the support of the Sustainability PD and DPD. Administrative, policy, and relevant subject matter expertise support is provided by laboratory and subcontractor personnel.

5.1. Regulatory Documents & Procedures

NSDD assists partner countries in establishing and improving national, regional, and site-level regulations, policies, and procedures necessary for the conduct of RDS operations and the response to nuclear security incidents. This assistance is provided to country teams by RD&P SMEs through several types of engagements, including legislative and regulatory research and direct support to outreach and sustainability visits. RD&P SMEs also lead capacity building workshops designed to increase Commitment Assessment scores and/or complete partner prerequisite for entering the Exercise Development Program. Planning and execution of these workshops is coordinated by the W/E functional team as described in Section 5.4. RD&P activities directly map to the **Policies and Procedures** performance category of the CNSA and Commitment Assessment, though they may also have capacity building value in other performance categories.

5.2. Training

The tasks associated with CNS operability require new skills and knowledge for partner stakeholders. NSDD has established the internal capability to design, develop, deliver, and evaluate the necessary training. The goal is to both deliver the appropriate training to partners and instill in those same partners the ability to manage their own training capability.

NSDD maintains a comprehensive catalog of curricula that is modular in design and customizable to meet each partner agency's specific needs. The curricula can be delivered on-site and remotely, using local, regional, or National Laboratory-based instructors. To extend the impact of this training, NSDD collaborates with international organizations such as the EC-JRC, GICNT, IAEA, ILEA, INTERPOL, and the WCO.

NSDD provides partners with access to a wide ranging, cross-disciplinary collection of SMEs through its training program. All SMEs must meet certain requirements and demonstrate various competencies before they can provide training on behalf of NSDD. NSDD strives to make training courses practical, responsive, and agile in meeting mission needs. In some cases, NSDD employs existing, externally developed curricula with interagency or subcontractor instructors.

While there is a core set of curricula that form a standard, common offering for partner agencies (provided in the *NSDD Course Catalog*), NSDD country teams are empowered to request the training most appropriate for

their partner's needs. Training courses are selected and approved as part of the annual budget process. Once a training event has been approved for the upcoming fiscal year, country teams are responsible for coordinating with their partner to schedule the event. The HQ Training lead and Laboratory support team are responsible for the preparations, logistics, delivery, and evaluation of the event. After each training event, course materials and other online resources are available to partner agencies via the Knowledge Management Website (KMW). Training activities directly map to the **Training** performance category of the CNS Assessment and Commitment Assessment, though they may also have capacity building value in other performance categories.

5.3. Maintenance

An effectively managed maintenance program is critical to radiation detection operability. NSDD's goal is to establish a complete maintenance capability with the partner agency operating the systems. Often the challenge is that the operating agency does not possess the technical or administrative competency to manage a maintenance program. Accordingly, the NSDD Maintenance functional area can both provide direct maintenance support to partners and assist partners in building their own maintenance capability. The common tactic for NSDD is to provide the maintenance directly for a period, while the partner agency eventually acquires the necessary technical and administrative competencies.

NSDD monitors the entire fleet of deployed RDS, which yields insight into faults and failures. Root cause or trend analysis of the equipment performance exceptions are used to develop maintenance procedures, replacement parts lists, and technical service bulletins. NSDD also applies such findings to the planning and preparation of service life extension campaigns (mentioned in Section 4).

The cost of maintenance is a common and significant barrier to partner agencies assuming maintenance responsibilities. NSDD works to minimize maintenance costs borne by partners through local and regional sourcing of parts and skilled technicians, preventative maintenance practices, optimized site configurations, training, benchtop repair capabilities, on-line chat rooms, and a resource materials website.

Country teams are responsible for selecting from the range of NSDD maintenance support activities to address their partner's specific maintenance deficiencies. In general, maintenance obligations associated with border operations (especially seaports) are significantly larger and more complex than frontier and interior operations. Also, radiation detection elements tend to have more maintenance concerns when compared to the mission-enabling elements, that are often managed as consumables. As part of the annual budget process, country teams plan their partner country's full maintenance needs, which can range across several agencies. Maintenance activities directly map to the **Maintenance** performance category of the CNS Assessment and Commitment Assessment, though they also have capacity building value in that is reflected in other performance categories.

5.4. Workshops and Exercises

Exercises play an integral role in ensuring the sustainability of partner country operations by allowing them to assess existing RDS plans, procedures, and protocols. The NSDD Workshops and Exercises Team works to build partner country capabilities in planning, designing, executing, and evaluating formal exercises. Exercise activities include a range of events from discussion-based to operations-based events and are scalable to ensure

flexibility in how these activities are used to evaluate RDS capabilities based on site, area, regional, or national-level evaluation requirements. The HQ W/E lead is responsible for managing the execution of all W/E events and is supported by other HQ and National Laboratory staff.

During the fiscal year planning process, country teams propose W/E events to assess, sustain, and enhance capabilities within their partner countries. The HQ W/E lead evaluates the proposed events and develops the initial list of events to be conducted the following fiscal year. This evaluation is based on several factors, including current partner country capability, past events, available funding, and staffing requirements. Throughout the fiscal year, the W/E team continues to evaluate the list of planned events and adjusts based on available resources and other program needs.

After the HQ W/E lead initiates an event, a team consisting of HQ W/E staff, country team members, SMEs, and an Event Coordinator (EC) are assigned to the event. The EC is responsible for scheduling routine planning meetings, publishing meeting notes, securing all necessary logistical support, and completing all event closeout activities. Depending on the size and complexity of the event, the EC may travel with the W/E team to provide additional support. At the completion of every event, an after-action report is generated.

The HQ W/E lead may also assign ECs to country budget activities, especially trainings or other events involving foreign participant travel, depending on the complexity of the activity. In such cases, the EC's involvement in the activity is funded out of the country budget. W/E activities are reflected in in all five performance categories, and support both the CNS Assessment and the Commitment Assessment.

5.5. Investigation Support

NSDD develops and delivers training, workshops, exercises, and peer-to-peer collaborations for the purpose of supporting the technical elements associated with the investigation and prosecution of nuclear smuggling incidents. NSDD Investigation Support capacity building efforts include categorizing radioactive materials in the field, identifying hazards associated with the materials, and properly handling the materials and other contaminated evidence. NSDD also supports partners in the analyses of nuclear and radioactive materials properties ("signatures") that can be used to catalog their domestic holdings and form an integral part of a national nuclear forensics library.

The scope and technical content of investigation support training, workshops, and exercises are tailored to be commensurate with the needs and technical infrastructure of the partner. NSDD offerings include topics critical to a baseline CNS operability, particularly regarding communication across partner agencies involved following an interdiction of R/N material. In select cases, NSDD capacity building includes provision of nuclear forensics laboratory equipment, such as gamma spectrometers, that can be used to provide more detailed analytical findings that support investigations. Furthermore, the NSDD investigation support curricula complements the assistance offerings provider by other international organizations.

Collaboration is key to all elements of the NSDD mission and plays a large role in Investigation Support. In addition to the IAEA and the Nuclear Forensics International Technical Working Group, NSDD collaborates

with the EC-JRC, Science and Technology Center in Ukraine, International Science and Technology Center, and the GICNT for implementing its Investigation Support activities. While NSDD does not have a formal nuclear forensics role in the U.S. interagency, it shares relevant, international capacity building activities with the U.S. interagency on a regular basis through the Forensics Engagement Working Group, chaired by the Department of State.

Traditional nuclear forensics includes capabilities addressed in NSDD's Investigation Support capacity building functional area and beyond to advanced laboratory capabilities necessary to determine the origin of interdicted materials. For most NSDD partners, such laboratory analysis methodologies are most practically acquired by developing relationships with regional and international nuclear forensics providers. For the select partners whose technical infrastructure can accommodate sophisticated laboratory capabilities, NSDD will collaborate on best practices and sample exchanges in the form of Peer-to-Peer Activities, as discussed in Section 5.6. Investigation Support activities contribute to Commitment Assessments in most performance categories.

5.6. Peer-to-Peer Activities

Continued engagement with partner agencies is a key element of NSDD's strategy, which recognizes the threat of nuclear and radiological terrorism as an on-going international concern important to U.S. national security. This continued engagement can take the form of discrete technical, policy, or procedural exchanges among peers, which further enhance the partner's detection operability. These engagement topics range from equipment test and evaluation, to system performance enhancement, to nuclear forensics methodologies. The specific exchange topic engaged is determined by a gap analysis performed collaboratively by the partner agency and NSDD. The actual scope of the exchange and the associated activities are determined by subject matter experts from the partner and NSDD in the relevant discipline.

To date, the most common Peer-to-Peer Activities are related to laboratory analysis methodologies that provide nuclear and radioactive materials signatures that can determine the origin of interdicted materials. These focus primarily on the exchange of best practices in the analysis of complex, difficult-to-handle materials like highly enriched uranium and plutonium. Subject matter experts that support Peer to Peer work are typically U.S. National Laboratory scientists that have decades of experience working with such materials. Peer-to-peer activities contribute to Commitment Assessments in most performance categories.

5.7. Data Analysis

NSDD's success in implementing capacity building activities is largely due to custom-developed tools for management processes, information gathering, data acquisition, analyses, and knowledge sharing. These data products are subject to continuing functional improvements and improved operational management. The principal objective is to enable partner agencies to optimize the operation, maintenance, and management of their radiation detection systems. Data Analysis provides information and tools to support both the CNS Assessment and Commitment Assessment across several performance categories.

5.7.1. Management and Information Acquisition Tools

NSDD has developed and maintains data tools in support of implementing its capacity building mission. Measuring the effectiveness of sustainability activities requires the acquisition and management of information, including but not limited to after action reports for training, workshops, and exercises; local maintenance provider reports; equipment settings and configuration; and sustainability reports. Furthermore, NSDD seeks to provide country teams with access to information and tools necessary to remediate deficiencies and plan outyear Sustainability activities.

5.7.2. Data Analysis for RDS Performance Assessments

NSDD has developed tools to analyze technical data from RPMs and the associated communications system to identify and remediate deficiencies and faults. The RDS analysis can be performed by the partner agency or by NSDD technical experts.

- The RPM generates and transmits a string of data at a certain rate, with each occupancy or event, and generates a report once a day. The assemblage of twenty-four hours' worth of data strings is call a *Daily File* which is stored automatically by the communications system. The analysis of *Daily Files* has been NSDD's most reliable method of assessing RPM performance. The analysis has been particularly effective in identifying performance trends associated with degraded gamma and neutron detection proficiency.
- In a similar manner, NSDD has developed a tool to acquire and analyze data related to the state of health for deployed communication systems and IT subsystems of a RDS.

5.7.3. Testing and Maintenance Tools

Radiation detection systems deployed by NSDD are commercially available technologies exhibiting proven, robust performance in the field. To optimize their sensitivity to gamma and/or neutron radiation, the detectors are subject to prescriptive electronic adjustment and calibration procedures. NSDD has developed guidance and supporting software tools for partners to facilitate testing, maintenance, and configuration control procedures.

For the radiation portal monitors (fixed and mobile deployments), these procedures are required at the initial operations and are part of the formal site acceptance testing implemented by NSDD. These same procedures are completed on a regular basis (typically annually) and whenever electronic settings are disturbed by maintenance activities. Handheld radiation detectors are subject to similar adjustments, and electronic-setting issues are common sources for performance faults.

5.7.4. Knowledge Management Website

The NSDD KMW disseminates information useful to partners in operating, maintaining, and managing their radiation detection systems. The KMW provides easy access to current, non-sensitive program information, including but not limited to training materials, maintenance procedures, technical service bulletins, tools, templates, and announcements. KMW content is regularly updated and available in over twenty languages.

Access to the KMW is controlled and limited to NSDD partner country points of contact nominated by country teams.

5.8. Performance Evaluation

As stated above, NSDD measurements and observations of partner agency operations are integral to quarterly CNSA reporting, the annual Commitment Assessment, and, in turn, to both mid-year and out-year Sustainability activities planning. Accordingly, NSDD guidance, training, and associated resources are provided for performance evaluation across the five performance categories.

NSDD performance evaluation by functional area is charged with objectively measuring the effectiveness of policy and procedure, training, operations, maintenance, and workshops and exercises. The concerns span the acquisition, analysis, and interpretation of data to the final diagnostic and judgmental outcomes. There are process complexities, to include extracting a coherent set of information with associated uncertainty from disparate data sets.

Part of the performance evaluation support to country teams entails mapping the assessment results to the appropriate NSDD capacity building activity. The NSDD functional teams provide both sources for the data acquisition and the set of tools for remediation. The performance evaluation support ensures that the structure and processes are available to support the crosslinking of these elements.

Appendix A: Supplementary Guidance Documents and Tools

This *Sustainability Program Description* is intended to be a concise rendering of the foundational structure and policies that govern NSDD's approach to capacity building. The implementation and management of sustainability activities are detailed in separate guidance documents, presentations, and tools. These items are maintained on the NNSD HQ Teams site and are subject to periodic revisions in keeping current with the evolving partner country needs and operating environment. The items listed below are reviewed annually to ensure continued applicability.

Sustainability Framework and Objectives

NNSA Performance Measure Change Request (2019). Formal accounting of change to new Congressional Performance Measure for NSDD going into force in FY2021.

Metric Determination Guide (Draft January 2021). Designed for country teams charged with quarterly performance assessment of partner agencies for the NSDD CNS Assessment.

Commitment Determination Guide (Draft February 2021). Designed for country teams charged with annual performance assessment of partner agencies as part of the NSDD Budget Planning Process.

Service Life Considerations

NSDD Radiation Detection Equipment Catalog 2020. Catalog providing up-to-date, high-level information on radiation detection technologies to NSDD decision-makers and partners to increase the understanding of instrument capabilities.

New Vectors Sustainability Guidance – Draft Dec 21, 2020. This document describes NSDD's sustainability approach to the new vectors.

NSDD Remote Access to Operational Systems Program Notice (Draft 2020). This notice outlines the considerations relating to VPN technology for remote access by NSDD stakeholders and associated cyber directives.

Sustainability Functional Areas

NSDD Course Catalog (May 2019). Course catalog of NSDD training courses. The catalog is organized by specific job roles and has many offerings including classroom, eLearning, and performance-based training for front line officers, maintenance providers, system administrators, and instructors.

Regulations Documents & Procedures (RD&P) Team Activity One-Pager (March 2020). Describes RD&P's activities and offerings for country teams.

Investigation Support Strategy (March 2021). Provides country teams with an overview of the goals and priorities for the Investigation Support functional area.

Workshops and Exercises Functional Area Overview (2021). Provides country teams with a detailed overview of the Workshops and Exercises functional area to include descriptions and associated qualifications and outcomes for each event.